

=> => FILE REG

FILE 'REGISTRY' ENTERED AT 12:16:51 ON 15 JUN 2007  
 USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.  
 PLEASE SEE "HELP USAGETERMS" FOR DETAILS.  
 COPYRIGHT (C) 2007 American Chemical Society (ACS)

=> D HIS

FILE 'HCAPLUS' ENTERED AT 11:02:41 ON 15 JUN 2007

L1 43589 S ISHIKAWA ?/AU  
 L2 5502 S KUROKI ?/AU  
 L3 2227 S FUJIYAMA ?/AU  
 L4 1482 S OMI ?/AU  
 L5 10201 S NAKATA ?/AU  
 L6 5116 S OKAWA ?/AU  
 L7 22450 S MIYAZAKI ?/AU  
 L8 45174 S FUJII ?/AU OR FUJI ?/AU  
 L9 5950 S TAMAI ?/AU  
 L10 1 S L1 AND L2 AND L3 AND L4 AND L5 AND L6 AND L7 AND L8 AND  
 SEL RN

FILE 'REGISTRY' ENTERED AT 11:03:40 ON 15 JUN 2007

L11 83 S E1-E83  
 L12 69 S L11 AND PMS/CI  
 E POLYETHER/PCT  
 L13 286481 S E3  
 E POLYKETONE/PCT  
 L14 20161 S E3  
 L15 9570 S L13 AND L14  
 L16 13 S L12 AND L15

FILE 'HCA' ENTERED AT 11:06:09 ON 15 JUN 2007

L17 5632 S L16

FILE 'REGISTRY' ENTERED AT 11:33:24 ON 15 JUN 2007

SEL L16 1,2,5,6,7 RN  
 L18 5 S E1-E5  
 SEL L16 3,4,9,10 RN  
 L19 4 S E6-E9

FILE 'HCA' ENTERED AT 11:34:00 ON 15 JUN 2007

L20 3 S L18  
 L21 2 S L19/D OR L19/DP  
 L22 QUE ?SULFAT? OR ?SULFONAT? OR ?CARBOXY? OR ?PHOSPHAT? OR  
 L23 2 S L21 (L) L22

FILE 'LREGISTRY' ENTERED AT 11:36:40 ON 15 JUN 2007

Access DB# 227926

## SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: TRUBNA, D.C. Examiner #: 69332 Date: June 14, 2007  
 Art Unit: 1711 Phone Number 302 181 Serial Number: 61820842  
 Mail Box and Bldg/Room Location: 15 D71 Results Format Preferred (circle) PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

\*\*\*\*\*

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc. if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

SCIENTIFIC REFERENCE BR  
Sci & Tech Inf. Ctr.

Title of Invention: \_\_\_\_\_

Inventors (please provide full names): \_\_\_\_\_

JUN 14 2007

Pat. &amp; T.M. Office

Earliest Priority Filing Date: \_\_\_\_\_

\*For Sequence Searches Only\* Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.

Formula (s) in claim 6, is included in a broad claim 1.  
 Sharks.

(Early priority date took out most of your art.)

## STAFF USE ONLY

Searcher: ET

Searcher Phone #: \_\_\_\_\_

Searcher Location: \_\_\_\_\_

Date Searcher Picked Up: \_\_\_\_\_

Date Completed: 6-15-07Searcher Prep & Review Time: 10

Clerical Prep Time: \_\_\_\_\_

Online Time: 130

## Type of Search

NA Sequence (#) \_\_\_\_\_

AA Sequence (#) \_\_\_\_\_

Structure (#) ✓ (7)Bibliographic ✓ (and)Litigation ✓

Fulltext \_\_\_\_\_

Patent Family \_\_\_\_\_

Other \_\_\_\_\_

## Vendors and cost where applicable

STN

\$ 713.34

Dialog

Questel/Orbit

Dr. Link

Lexis/Nexis

Sequence Systems

WWW/Internet

Other (specify) \_\_\_\_\_

L24 STR  
L25 STR

FILE 'REGISTRY' ENTERED AT 11:40:27 ON 15 JUN 2007

L26 2 S L24 AND L25 SSS SAM SUB=L15  
L27 6 POLYLINK L18  
L28 5 POLYLINK L19

FILE 'HCA' ENTERED AT 11:41:46 ON 15 JUN 2007

L29 4 S L27  
L30 2 S L28/D OR L28/DP  
L31 2 S L30 (L) L22

FILE 'REGISTRY' ENTERED AT 11:43:21 ON 15 JUN 2007

L32 55 S L24 AND L25 SSS FUL SUB=L15  
SAV L32 TRU849/A  
L33 70 POLYLINK L32  
L34 36 S L33 NOT N/ELS  
L35 34 S L33 NOT L34  
E POLYIMIDE/PCT  
L36 57925 S E3  
E POLYACRYLIC/PCT  
L37 339318 S E3  
L38 47 S L33 NOT (L36 OR L37)  
L39 23 S L33 NOT L38  
L40 0 S L38 AND C H N/ELF  
L41 36 S L38 NOT N/ELS  
L42 11 S L38 NOT L41  
SEL L42 4,7,8 RN  
L43 3 S E1-E3  
L44 5 POLYLINK L43

FILE 'HCA' ENTERED AT 11:59:12 ON 15 JUN 2007

L45 4 S L44

FILE 'REGISTRY' ENTERED AT 11:59:24 ON 15 JUN 2007

SEL L41 7,9,16 RN  
L46 3 S E4-E6

FILE 'HCA' ENTERED AT 12:05:14 ON 15 JUN 2007

L47 5 S L46

FILE 'REGISTRY' ENTERED AT 12:05:24 ON 15 JUN 2007

SEL L41 1-6,8,10,11,13,14,15,17-29 RN  
L48 25 S E7-E31  
SEL L48 2-18 RN  
L49 17 S E32-E48  
SEL L48 19,20,21,22,23,24,25 RN

L50 7 S E49-E55

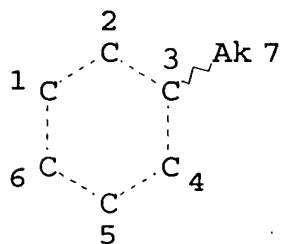
FILE 'HCA' ENTERED AT 12:12:31 ON 15 JUN 2007

L51 12 S L49  
 L52 0 S L50/D OR L50/DP  
 L53 2 S L50  
 L54 0 S L53 AND L22  
 L55 15 S L20 OR L23 OR L29 OR L31 OR L45 OR L47 OR L51  
 L56 4 S 1840-2001/PY,PRY AND L55  
 L57 11 S L55 NOT L56

FILE 'REGISTRY' ENTERED AT 12:16:51 ON 15 JUN 2007

=> D L32 QUE STAT

L13 286481 SEA FILE=REGISTRY POLYETHER/PCT  
 L14 20161 SEA FILE=REGISTRY POLYKETONE/PCT  
 L15 9570 SEA FILE=REGISTRY L13 AND L14  
 L24 STR



NODE ATTRIBUTES:

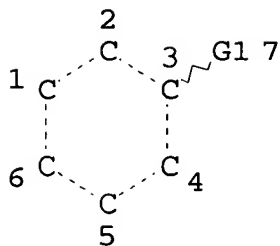
CONNECT IS E1 RC AT 7  
 DEFAULT MLEVEL IS ATOM  
 GGCAT IS LIN SAT AT 7  
 DEFAULT ECLEVEL IS LIMITED  
 ECOUNT IS M1-X10 C AT 7

GRAPH ATTRIBUTES:

RSPEC I  
 NUMBER OF NODES IS 7

STEREO ATTRIBUTES: NONE

L25 STR



VAR G1=COOH/SO3H/OSO3H/PO3H2/OPO3H2

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RSPEC I

NUMBER OF NODES IS 7

STEREO ATTRIBUTES: NONE

L32 55 SEA FILE=REGISTRY SUB=L15 SSS FUL L24 AND L25

100.0% PROCESSED 1188 ITERATIONS

55 ANSWERS

SEARCH TIME: 00.00.01

=> FILE HCA

FILE 'HCA' ENTERED AT 12:17:01 ON 15 JUN 2007

USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.

PLEASE SEE "HELP USAGETERMS" FOR DETAILS.

COPYRIGHT (C) 2007 AMERICAN CHEMICAL SOCIETY (ACS)

=> D L56 1-4 CBIB ABS HITSTR HITRN

L56 ANSWER 1 OF 4 HCA COPYRIGHT 2007 ACS on STN

138:339060 Crosslinkable aromatic resins having protonic acid groups and ion conductive polymer membranes, binders, and fuel cells made by using the same. Ishikawa, Junichi; Kuroki, Takashi; Fujiyama, Satoko; Omi, Takehiko; Nakata, Tomoyuki; Okawa, Yuichi; Miyazaki, Kazuhisa; Fujii, Shigeharu; Tamai, Shoji (Mitsui Chemicals, Inc., Japan). PCT Int. Appl. WO 2003033566 A1 20030424, 132 pp. DESIGNATED STATES: W: CA, CN, IN, JP, KR, US; RW: DE, FR, GB, IT, SE. (Japanese). CODEN: PIXXD2. APPLICATION: WO 2002-JP10536 20021010. PRIORITY: JP 2001-312799 20011010; JP 2002-182252

*Hydants*

20020621.

AB The invention relates to (A) a crosslinkable arom. resin which has crosslinking groups and protonic acid groups and is suitable for electrolyte membranes and binders for fuel cells, (B) polymeric electrolyte membranes and binders for fuel cells, made by using the resin, and (C) fuel cells made by using the membranes or the binders. The arom. resin has crosslinking groups which are not derived from protonic acid groups and are capable of causing crosslinking without the formation of a leaving component, and exhibits excellent ionic cond., heat resistance, water resistance, and adhesion, and low methanol permeability. It is preferable that the arom. resin bears as the crosslinking groups both C1-10 alkyl bonded directly to an arom. ring and carbonyl or carbon-carbon double or triple bonds, while preferred examples of the crosslinkable arom. resin include arom. polyether, arom. polyamide, arom. polyimide, arom. polyamide-imide, and arom. polyazole, each of which has crosslinking groups described above. Thus, 5,5'-carbonylbis(sodium 2-fluorobenzenesulfonate) obtained from 0.525 mol 4,4'-difluorobenzophenone and 210 mL 50% sulfuric acid 4.22, 4,4'-difluorobenzophenone 2.18, and 2,2-bis(3,5-dimethyl-4-hydroxyphenyl)propane 5.69 g were reacted at 160° for 4 h in the presence of potassium carbonate to give 10.39 g polyether ketone powder with reduced viscosity 0.85 dL/g, glass transition temp. 230°, and 5% wt. loss temp. 367°, which was applied on a glass and dried at 200° for 4 h to give a membrane with cond. 0.018 S/cm at 30° and 0.065 S/cm at 90°.

IT 515144-35-1P 515144-44-2DP, sulfonated  
515144-45-3DP, sulfonated 515144-47-5P  
515144-58-8P 515144-59-9P

(crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer membranes, binders, and fuel cells)

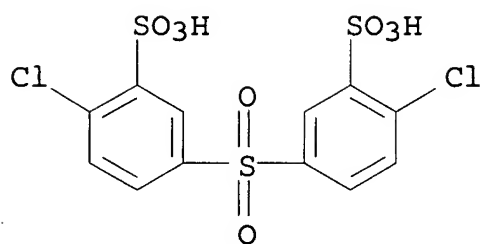
RN 515144-35-1 HCA

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with bis(4-chlorophenyl)methanone and 4,4'-methylenebis[2,6-dimethylphenol] (9CI) (CA INDEX NAME)

CM 1

CRN 51698-33-0

CMF C12 H8 Cl2 O8 S3 . 2 Na

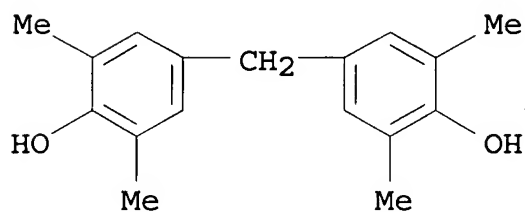


●2 Na

CM 2

CRN 5384-21-4

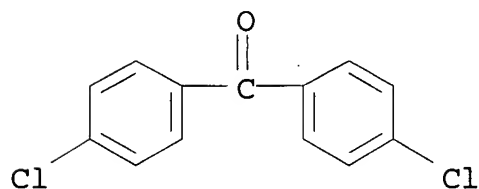
CMF C17 H20 O2



CM 3

CRN 90-98-2

CMF C13 H8 Cl2 O

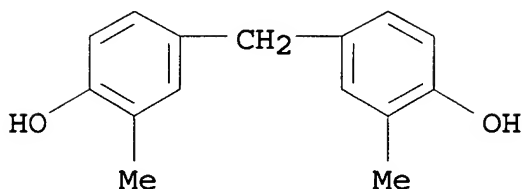


RN 515144-44-2 HCA

CN Methanone, bis(4-fluorophenyl)-, polymer with 4,4'-methylenebis[2-methylphenol] (9CI) (CA INDEX NAME)

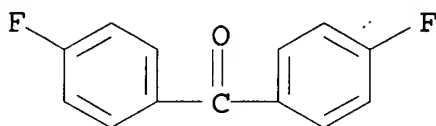
CM 1

CRN 2467-25-6  
CMF C15 H16 O2

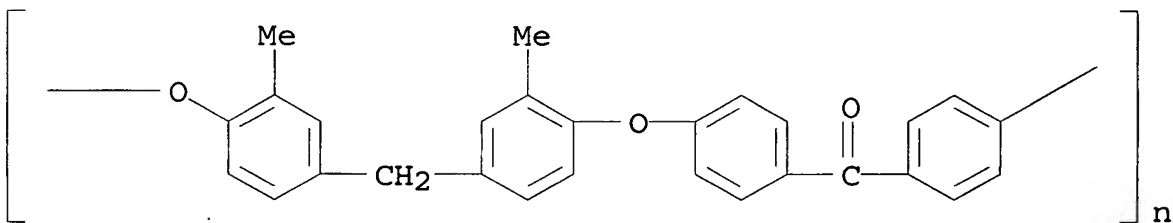


CM 2

CRN 345-92-6  
CMF C13 H8 F2 O



RN 515144-45-3 HCA  
CN Poly[oxy(2-methyl-1,4-phenylene)methylene(3-methyl-1,4-phenylene)oxy-1,4-phenylenecarbonyl-1,4-phenylene] (9CI) (CA INDEX NAME)

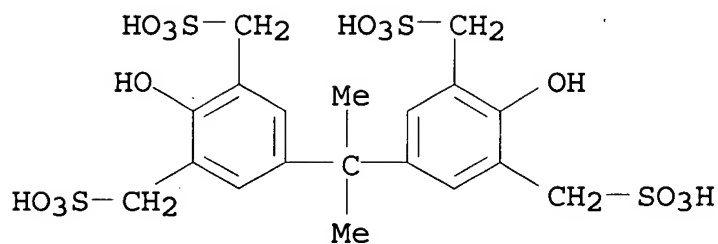


RN 515144-47-5 HCA  
CN 1,3-Benzenedimethanesulfonic acid, 5,5'-(1-methylethylidene)bis[2-hydroxy-, tetrasodium salt, polymer with bis(4-fluorophenyl)methanone and 4,4'-methylenebis[2,6-dimethylphenol] (9CI) (CA INDEX NAME)

CM 1

CRN 515144-46-4  
CMF C19 H24 O14 S4 . 4 Na



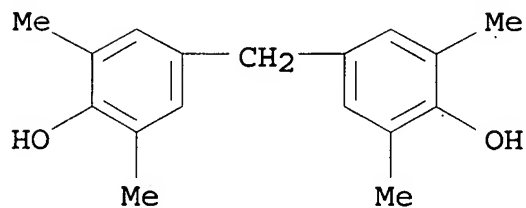


●4 Na

CM 2

CRN 5384-21-4

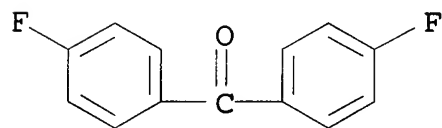
CMF C17 H20 O2



CM 3

CRN 345-92-6

CMF C13 H8 F2 O



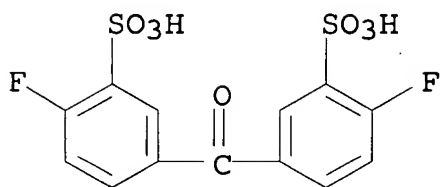
RN 515144-58-8 HCA

CN Benzenesulfonic acid, 3,3'-carbonylbis[6-fluoro-, disodium salt, polymer with 4,4'-(1-methylethylenediyl)bis[2,6-dimethylphenol] (9CI) (CA INDEX NAME)

CM 1

CRN 210531-45-6

CMF C13 H8 F2 O7 S2 . 2 Na

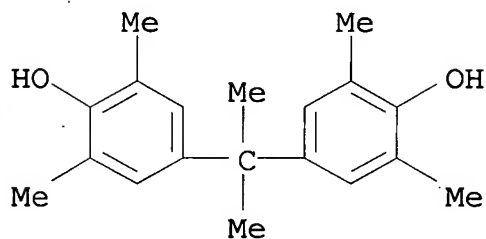


● 2 Na

CM 2

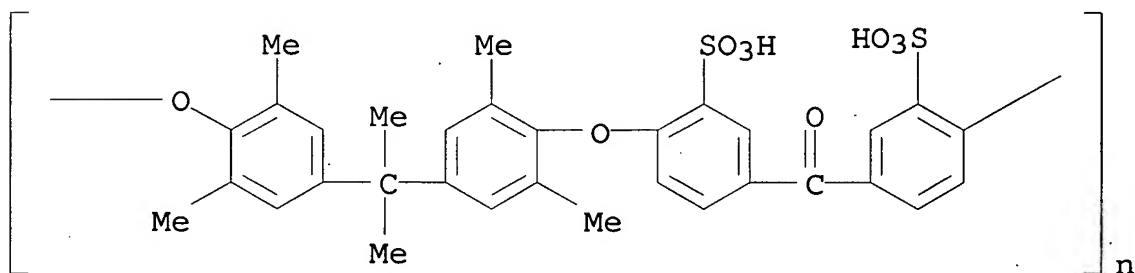
CRN 5613-46-7

CMF C19 H24 O2



RN 515144-59-9 HCA

CN Poly[oxy(2,6-dimethyl-1,4-phenylene)(1-methylethylidene)(3,5-dimethyl-1,4-phenylene)oxy(2-sulfo-1,4-phenylene)carbonyl(3-sulfo-1,4-phenylene) disodium salt] (9CI) (CA INDEX NAME)



● 2 Na

IT 515144-34-0P

(optionally crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer membranes, binders, and fuel cells)

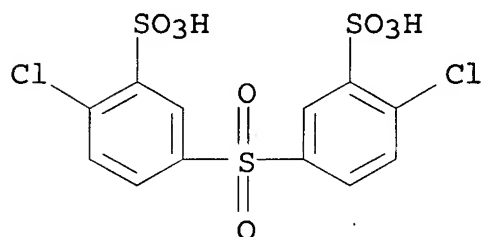
RN 515144-34-0 HCA

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with bis(4-fluorophenyl)methanone and 4,4'-(1-methylethylidene)bis[2,6-dimethylphenol] (9CI) (CA INDEX NAME)

CM 1

CRN 51698-33-0

CMF C12 H8 Cl2 O8 S3 . 2 Na

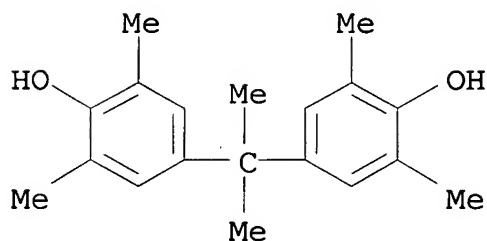


●2 Na

CM 2

CRN 5613-46-7

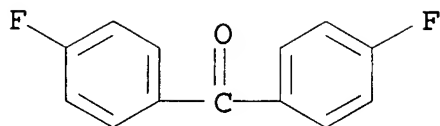
CMF C19 H24 O2



CM 3

CRN 345-92-6

CMF C13 H8 F2 O



IT 515144-28-2P

(prepn. of crosslinkable arom. resins having protonic acid groups  
for ion conductive polymer membranes, binders, and fuel cells)

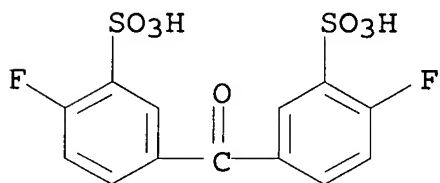
RN 515144-28-2 HCA

CN Benzenesulfonic acid, 3,3'-carbonylbis[6-fluoro-, disodium salt,  
polymer with bis(4-fluorophenyl)methanone and 4,4'-oxybis[2,6-  
dimethylphenol] (9CI) (CA INDEX NAME)

CM 1

CRN 210531-45-6

CMF C13 H8 F2 O7 S2 . 2 Na

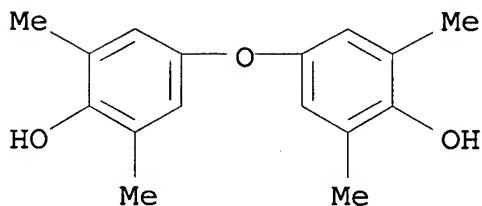


● 2 Na

CM 2

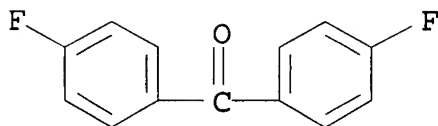
CRN 7378-12-3

CMF C16 H18 O3



CM 3

CRN 345-92-6  
CMF C13 H8 F2 O



- IT 515144-35-1P 515144-44-2DP, sulfonated  
515144-45-3DP, sulfonated 515144-47-5P  
515144-58-8P 515144-59-9P  
(crosslinked; prepn. of crosslinkable arom. resins having  
protonic acid groups for ion conductive polymer membranes,  
binders, and fuel cells)
- IT 515144-34-0P  
(optionally crosslinked; prepn. of crosslinkable arom. resins  
having protonic acid groups for ion conductive polymer membranes,  
binders, and fuel cells)
- IT 515144-28-2P  
(prepn. of crosslinkable arom. resins having protonic acid groups  
for ion conductive polymer membranes, binders, and fuel cells)
- L56 ANSWER 2 OF 4 HCA COPYRIGHT 2007 ACS on STN
- 132:3863 Gas separation properties of modified poly(ether  
ketone[sulfone]) with phthalic side group - Role of pendent groups  
and physical cross-linking on gas permeation properties of polymers.  
Xu, Jiping; Wang, Zhonggang; Chen, Tianlu (Changchun Institute of  
Applied Chemistry, CAS, Changchun, 130022, Peop. Rep. China). ACS  
Symposium Series, 733, 269-276 (English) 1999. CODEN:  
ACSMC8. ISSN: 0097-6156. Publisher: American Chemical Society.
- AB Phenolphthalein based polyetherketone and polyethersulfone (PEK-C &  
PES-C) were modified to improve their gas permeation properties.  
The influence of side groups on gas permeation properties was  
studied by using dimethylphenolphthalein (DMPPH),  
tetramethylphenolphthalein (TMPPH) and diisopropyldimethyl-  
phenolphthalein (DIDMPPH) to synthesize a systematic series of  
polymers. The di-Me substituted polymers show lower gas  
permeabilities than unsubstituted ones, while the TM- and DIDM-  
polymers give enhanced permeabilities. In some cases, simultaneous  
increases of both permeability and permselectivity were obsd. The  
reasons were discussed in terms of free vol. The lactone ring of  
the pendent phthalic group of phenolphthalein and its derivs. was  
opened by redn. to the corresponding phenolphthalein(PPL)s and their  
polyetherketone(sulfone) analogs were synthesized. Introduction of  
pendent carboxylic groups greatly enhanced the permeability and/or  
permselectivity. Ionomers obtained from salt formation of the PPL

polymers show very high gas permselectivity.

IT 187091-29-8 187091-30-1

(role of pendent groups and phys. crosslinking on gas permeation properties of modified poly(ether ketone[sulfone]))

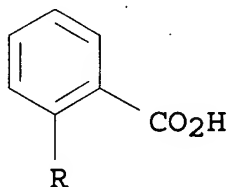
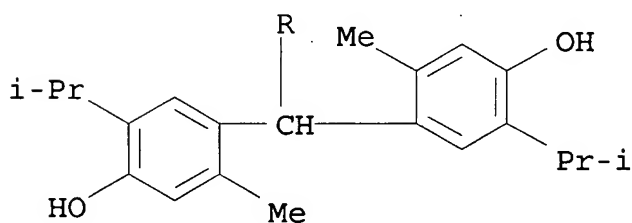
RN 187091-29-8 HCA

CN Benzoic acid, 2-[bis[4-hydroxy-2-methyl-5-(1-methylethyl)phenyl)methyl]-, polymer with bis(4-nitrophenyl)methanone (9CI) (CA INDEX NAME)

CM 1

CRN 104970-88-9

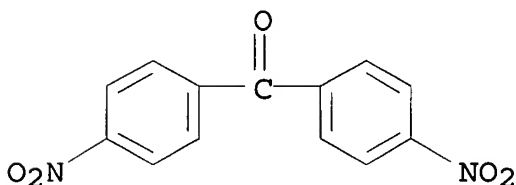
CMF C28 H32 O4



CM 2

CRN 1033-26-7

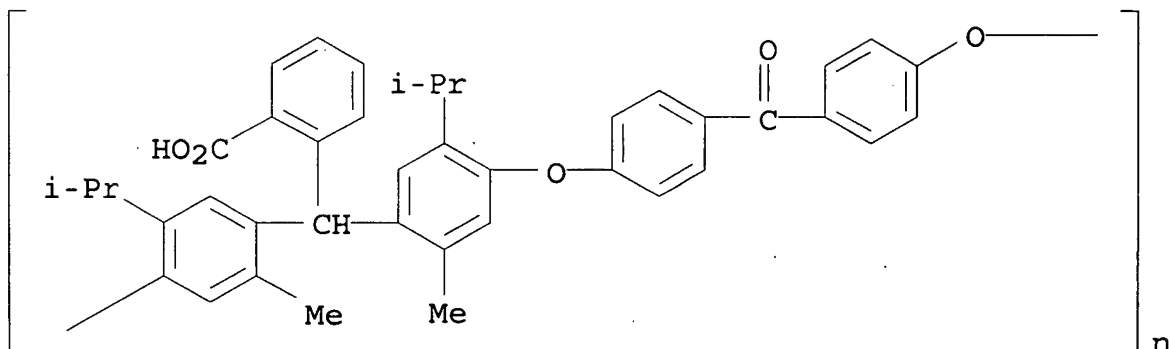
CMF C13 H8 N2 O5



RN 187091-30-1 HCA

CN Poly[oxy-1,4-phenylenecarbonyl-1,4-phenyleneoxy[5-methyl-2-(1-methylethyl)-1,4-phenylene] [(2-carboxyphenyl)methylene] [2-methyl-5-

(1-methylethyl)-1,4-phenylene]] (9CI) (CA INDEX NAME)



IT 187091-29-8 187091-30-1

(role of pendent groups and phys. crosslinking on gas permeation properties of modified poly(ether ketone[sulfone]))

L56 ANSWER 3 OF 4 HCA COPYRIGHT 2007 ACS on STN

126:331182 Novel poly(aryl ether ketone)s containing various pendant groups. II. Gas-transport properties. Wang, Zhonggang; Chen, Tianlu; Xu, Jiping (Department of Chemistry, Peking University, Beijing, 100871, Peop. Rep. China). Journal of Applied Polymer Science, 64(9), 1725-1732 (English) 1997. CODEN: JAPNAB. ISSN: 0021-8995. Publisher: Wiley.

AB The gas transport of hydrogen, oxygen, nitrogen, carbon dioxide, and methane gases in a series of poly(aryl ether ketone)s was examd. These polymer membranes have a wide range of permeability coeffs. and permselectivity coeffs., showing excellent gas-transport properties. The enhanced interchain interaction in the polymers due to intermol. hydrogen bonds and ionic bonds results in a considerable increase in permselectivity but a decrease in permeability. On the contrary, the polymers with bulky alkyl substituents show significantly increased permeability. The causes of this trend are interpreted in terms of the free vol., interchain distance, and glass transition temp. together with the resp. contribution of gas soly. and diffusivity to the overall permeability. Of interest is the observation that the ionomer which contains bulky iso-Pr substituents and pendant carboxylate groups exhibits over twice the CO<sub>2</sub> permeability and 15% higher CO<sub>2</sub>/CH<sub>4</sub> permselectivity, compared with bisphenol-A polysulfone. The possibility of using the new poly(aryl ether ketone)s in gas sepn. membrane application is also discussed.

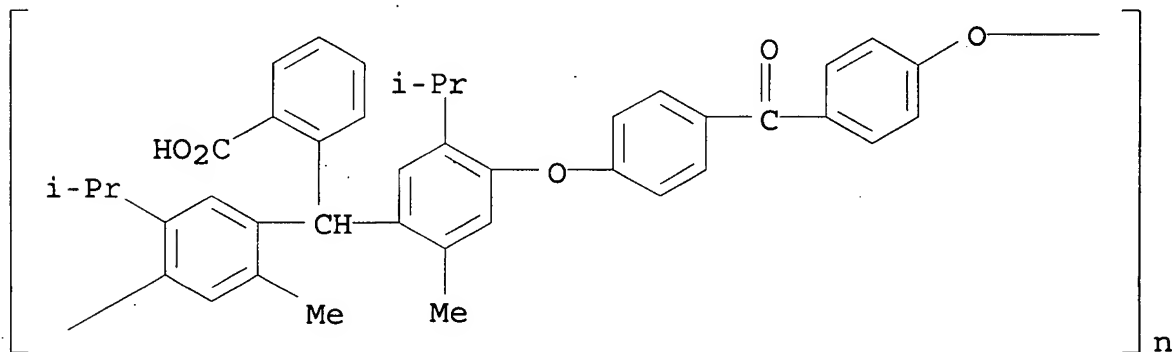
IT 187091-30-1 187091-36-7 189631-22-9

(gas transport properties of poly(aryl ether ketone)s contg. various pendant groups)

RN 187091-30-1 HCA

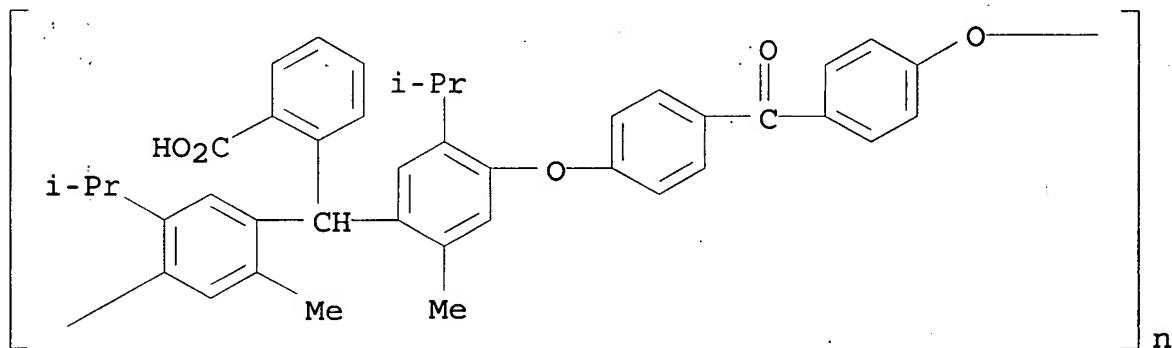
CN Poly[oxy-1,4-phenylenecarbonyl-1,4-phenyleneoxy[5-methyl-2-(1-

methylethyl)-1,4-phenylene] [(2-carboxyphenyl)methylene] [2-methyl-5-(1-methylethyl)-1,4-phenylene]] (9CI) (CA INDEX NAME)



RN 187091-36-7 HCA

CN Poly[oxy-1,4-phenylenecarbonyl-1,4-phenyleneoxy[5-methyl-2-(1-methylethyl)-1,4-phenylene] [(2-carboxyphenyl)methylene] [2-methyl-5-(1-methylethyl)-1,4-phenylene]], sodium salt (9CI) (CA INDEX NAME)

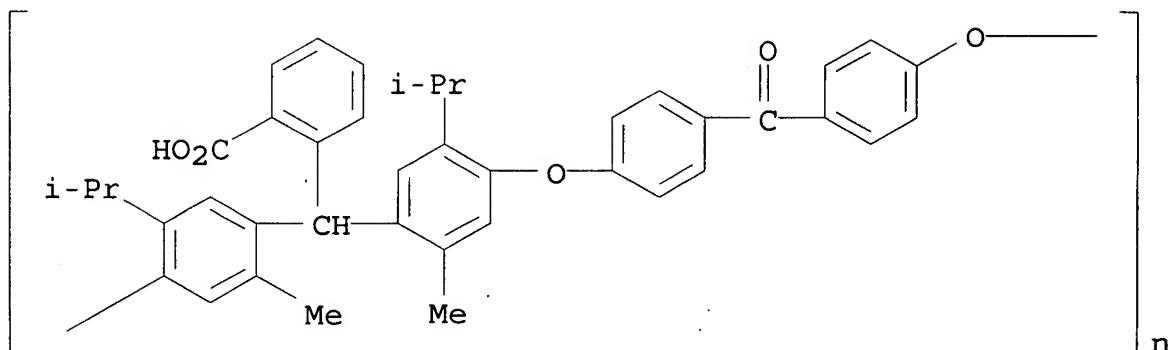


●x Na

RN 189631-22-9 HCA

CN Poly[oxy-1,4-phenylenecarbonyl-1,4-phenyleneoxy[5-methyl-2-(1-methylethyl)-1,4-phenylene] [(2-carboxyphenyl)methylene] [2-methyl-5-(1-methylethyl)-1,4-phenylene]], potassium salt (9CI) (CA INDEX NAME)





●x K

IT 187091-30-1 187091-36-7 189631-22-9

(gas transport properties of poly(aryl ether ketone)s contg. various pendant groups)

L56 ANSWER 4 OF 4 HCA COPYRIGHT 2007 ACS on STN

126:171991 Novel polyaryletherketones containing various pendant groups.

I. Synthesis and characterization. Wang, Zhonggang; Chen, Tianlu; Xu, Jiping (Department of Chemistry, Peking University, Beijing, 100871, Peop. Rep. China). Journal of Applied Polymer Science, 63(9), 1127-1135 (English) 1997. CODEN: JAPNAB. ISSN: 0021-8995. Publisher: Wiley.

AB High-Tg poly(aryletherketones) contg. pendant amido, alkyl, and carboxy groups were prep'd. by soln. nucleophilic polycondensation of phenolphthalein, 2',2''-diisopropyl-5',5''-dimethylphenolphthalein (I), and 3,3'-bis(4-hydroxyphenyl)isobenzopyrrolidone with bis(4-nitrophenyl) ketone in the presence of K<sub>2</sub>CO<sub>3</sub>. Ionomers also were prep'd. by ion exchange with Na<sup>+</sup> and K<sup>+</sup>. A monomer simultaneously contg. carboxy and alkyl substituents was prep'd. by redn. of I. The polymers were sol. in a few polar aprotic solvents; transparent, colorless, and tough films could easily be cast from DMF or DMSO solns. The mech. properties of the films were excellent; and their tensile strength, elongation at break, and tensile moduli were 67.1-97.1 MPa, 7.8-165%, and 1.47-2.27 GPa, resp. The polymers showed fairly good thermal stability and T<sub>g</sub> >210°.

IT 187091-29-8P, 2-[Bis(4-hydroxy-5-isopropyl-2-methylphenyl)methyl]benzoic acid-bis(4-nitrophenyl) ketone copolymer  
187091-30-1P, 2-[Bis(4-hydroxy-5-isopropyl-2-methylphenyl)methyl]benzoic acid-bis(4-nitrophenyl) ketone copolymer  
sru 187091-35-6P 187091-36-7P

(prepn. characterization and properties of)

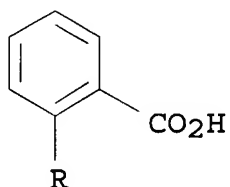
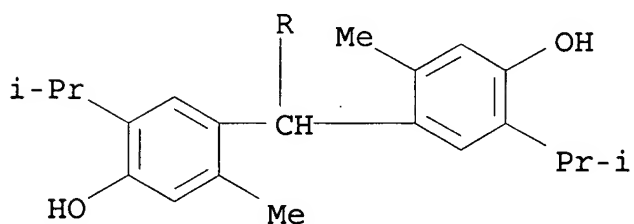
RN 187091-29-8 HCA

CN Benzoic acid, 2-[bis[4-hydroxy-2-methyl-5-(1-methylethyl)phenyl]methyl]-, polymer with bis(4-nitrophenyl)methanone (9CI) (CA INDEX NAME)

CM 1

CRN 104970-88-9

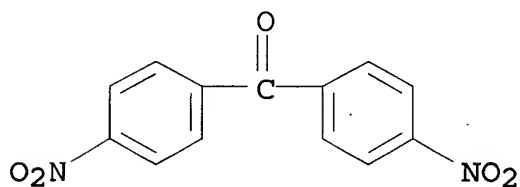
CMF C28 H32 O4



CM 2

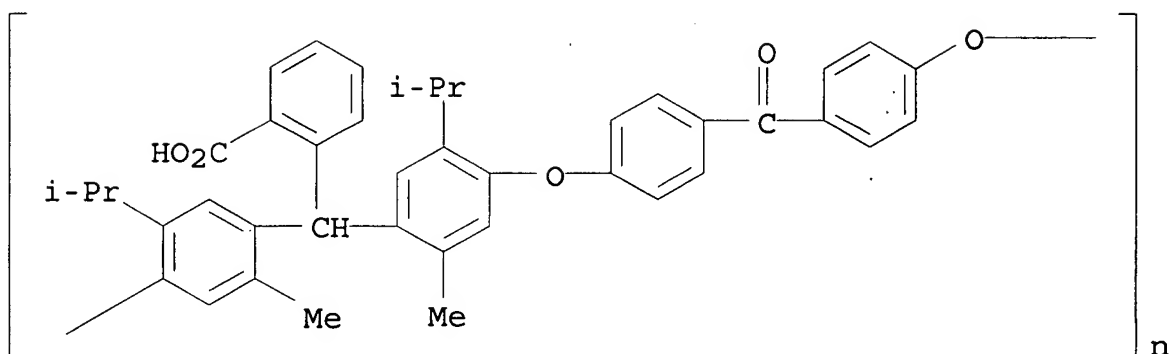
CRN 1033-26-7

CMF C13 H8 N2 O5



RN 187091-30-1 HCA

CN Poly[oxy-1,4-phenylenecarbonyl-1,4-phenyleneoxy[5-methyl-2-(1-methylethyl)-1,4-phenylene] [(2-carboxyphenyl)methylene] [2-methyl-5-(1-methylethyl)-1,4-phenylene]] (9CI) (CA INDEX NAME)



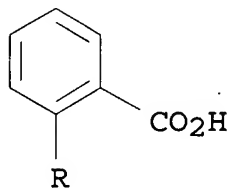
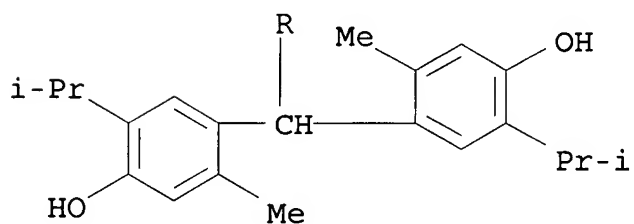
RN 187091-35-6 HCA  
 CN Benzoic acid, 2-[bis[4-hydroxy-2-methyl-5-(1-methylethyl)phenyl]methyl]-, polymer with bis(4-nitrophenyl)methanone, sodium salt (9CI) (CA INDEX NAME)

CM 1

CRN 187091-29-8  
 CMF (C28 H32 O4 . C13 H8 N2 O5)x  
 CCI PMS

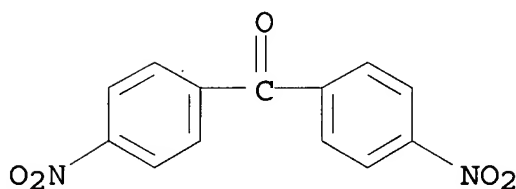
CM 2

CRN 104970-88-9  
 CMF C28 H32 O4

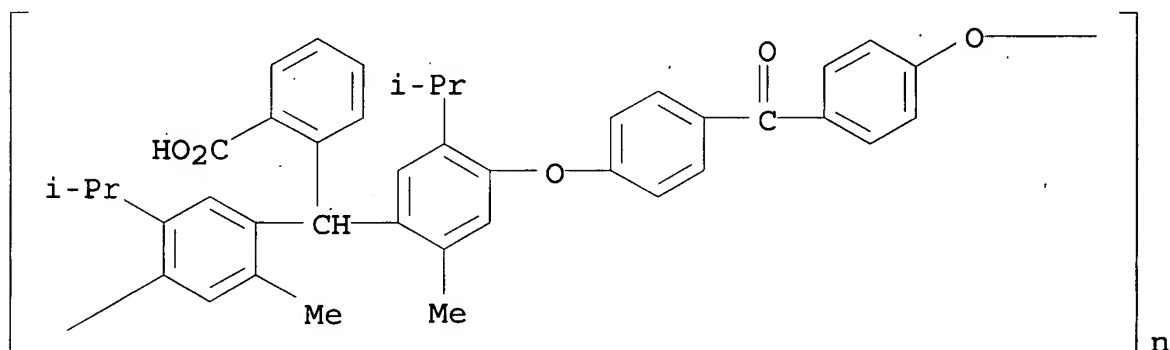


CM 3

CRN 1033-26-7  
CMF C13 H8 N2 O5



RN 187091-36-7 HCA  
CN Poly[oxy-1,4-phenylenecarbonyl-1,4-phenyleneoxy[5-methyl-2-(1-methylethyl)-1,4-phenylene] [(2-carboxyphenyl)methylene] [2-methyl-5-(1-methylethyl)-1,4-phenylene]], sodium salt (9CI) (CA INDEX NAME)



●x Na

IT 187091-29-8P, 2-[Bis(4-hydroxy-5-isopropyl-2-methylphenyl)methyl]benzoic acid-bis(4-nitrophenyl) ketone copolymer  
187091-30-1P, 2-[Bis(4-hydroxy-5-isopropyl-2-methylphenyl)methyl]benzoic acid-bis(4-nitrophenyl) ketone copolymer  
sru 187091-35-6P 187091-36-7P  
(prepn. characterization and properties of)

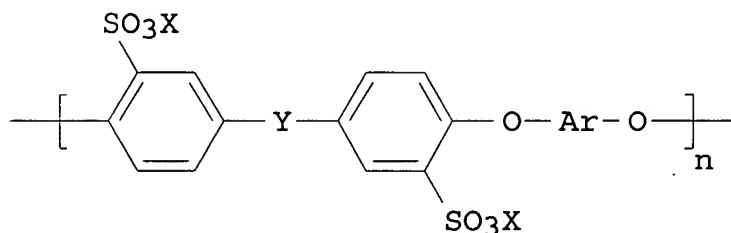
=> D L57 1-11 CBIB ABS HITSTR HITRN

↓↓↓ (dates probably not good)

L57 ANSWER 1 OF 11 HCA COPYRIGHT 2007 ACS on STN  
143:327041 Crosslinkable sulfo group-containing polyarylene ethers,  
their manufacture, and uses as ion conductive films for fuel cells

and adhesives. Sakaguchi, Yoshimitsu; Kitamura, Kota (Toyobo Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2005264008 A 20050929, 20 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2004-79465 20040319.

GI



I

AB The polymers contain structural units I (Ar = divalent arom. group; Y = SO<sub>2</sub>, CO; X = H, cation), QOAr'O (Q = cyanophenylene; Ar' = divalent arom. group), and heat- and/or photocrosslinkable components. Thus, 3,3'-disulfo-4,4'-dichlorodiphenyl sulfone disodium salt, 2,6-dichlorobenzonitrile, 4,4'-biphenol, 4,4'-difluorobenzophenone, and bis(4-hydroxy-2,5-dimethylphenyl)methane were polycond., cast, and irradiated by UV to give a film showing ion cond. 0.32 S/cm and 20% swelling in the machine direction after immersion in H<sub>2</sub>O at 60° for 1 h.

IT **865145-00-2P**, 4,4'-Biphenol-bis(4-hydroxy-2,5-dimethylphenyl)methane-2,6-dichlorobenzonitrile-4,4'-difluorobenzophenone-3,3'-disulfo-4,4'-dichlorodiphenyl sulfone disodium salt copolymer

(manuf. of crosslinkable sulfo group-contg. polyarylene ethers for ion conductive films for fuel cells and adhesives)

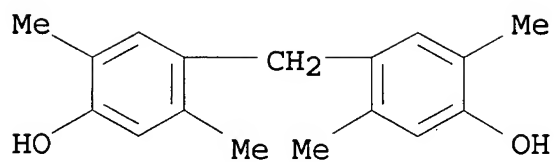
RN 865145-00-2 HCA

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with [1,1'-biphenyl]-4,4'-diol, bis(4-fluorophenyl)methanone, 2,6-dichlorobenzonitrile and 4,4'-methylenebis[2,5-dimethylphenol] (9CI) (CA INDEX NAME)

CM 1

CRN 111329-41-0

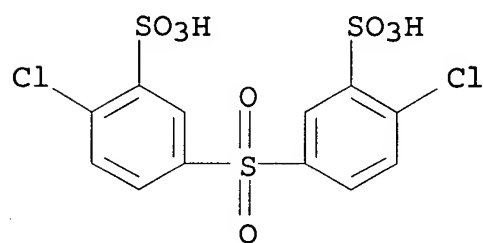
CMF C17 H20 O2



CM 2

CRN 51698-33-0

CMF C12 H8 Cl2 O8 S3 . 2 Na

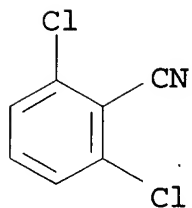


● 2 Na

CM 3

CRN 1194-65-6

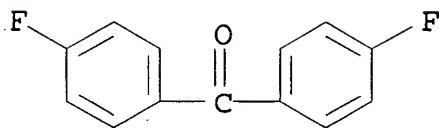
CMF C7 H3 Cl2 N



CM 4

CRN 345-92-6

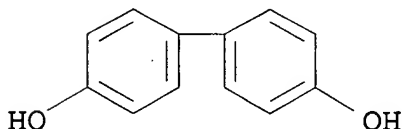
CMF C13 H8 F2 O



CM 5

CRN 92-88-6

CMF C12 H10 O2



IT **865145-00-2P**, 4,4'-Biphenol-bis(4-hydroxy-2,5-dimethylphenyl)methane-2,6-dichlorobenzonitrile-4,4'-difluorobenzophenone-3,3'-disulfo-4,4'-dichlorodiphenyl sulfone disodium salt copolymer  
(manuf. of crosslinkable sulfo group-contg. polyarylene ethers for ion conductive films for fuel cells and adhesives)

L57 ANSWER 2 OF 11 HCA COPYRIGHT 2007 ACS on STN

142:201622 Electrolyte membrane and electrodes for fuel cell assembly. Yamashita, Masahiro; Sakaguchi, Yoshimitsu; Takase, Satoshi; Kitamura, Kota (Toyo Boseki Kabushiki Kaisha, Japan). PCT Int. Appl. WO 2005013399 A1 20050210, 90 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (Japanese). CODEN: PIXXD2. APPLICATION: WO 2004-JP10807 20040729. PRIORITY: JP 2003-204725 20030731; JP 2004-39238 20040217; JP 2004-50749 20040226; JP 2004-50750 20040226; JP 2004-50751 20040226; JP 2004-53385 20040227; JP 2004-53386 20040227; JP 2004-53388 20040227.

AB Disclosed is an electrolyte membrane-electrode assembly wherein a hydrocarbon-based solid polymer electrolyte membrane is sandwiched between a pair of electrodes. In this electrolyte membrane-electrode assembly, the glass transition temp. of the electrolyte membrane in a dry state is not less than 160°C

and the max. moisture content of the electrolyte membrane is 10-120%. The electrolyte membrane-electrode assembly is excellent in reliability and durability.

IT 839469-88-4P

(prepn. of electrolyte membrane and electrodes for fuel cell assembly)

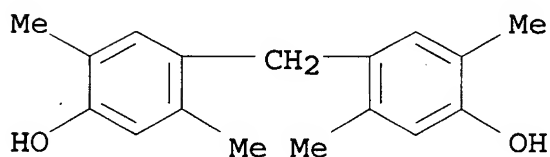
RN 839469-88-4 HCA

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with [1,1'-biphenyl]-4,4'-diol, bis(4-fluorophenyl)methanone and 4,4'-methylenebis[2,5-dimethylphenol] (9CI) (CA INDEX NAME)

CM 1

CRN 111329-41-0

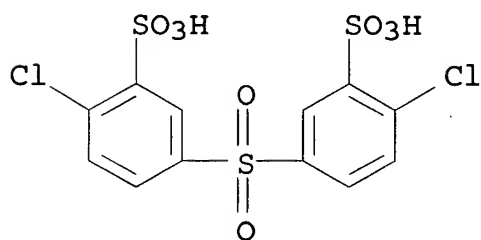
CMF C17 H20 O2



CM 2

CRN 51698-33-0

CMF C12 H8 Cl2 O8 S3 . 2 Na



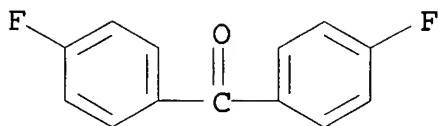
● 2 Na

CM 3

CRN 345-92-6

CMF C13 H8 F2 O

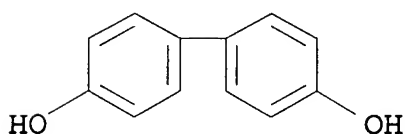




CM 4

CRN 92-88-6

CMF C12 H10 O2



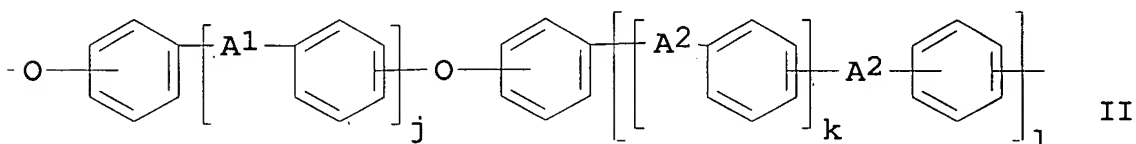
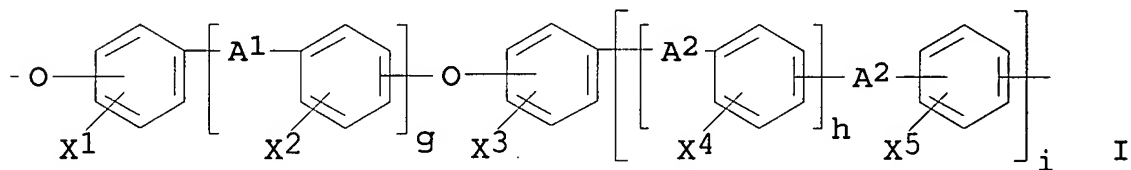
IT 839469-88-4P

```
(prepn. of electrolyte membrane and electrodes for fuel cell
assembly)
```

L57 ANSWER 3 OF 11 HCA COPYRIGHT 2007 ACS on STN

142:77601 Proton conductive block-copolymers with good water resistance and low moisture absorption and low methanol penetration for proton conductive membranes. Ishikawa, Junichi; Omi, Katsuhiko; Fujiyama, Akiko; Toriida, Masahiro; Takeda, Koji; Kuroki, Takashi; Tamai, Masashi (Mitsui Chemicals Inc., Japan). Jpn. Kokai Tokkyo Koho JP 2004359925 A 20041224, 19 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2003-207951 20030819. PRIORITY: JP 2003-102682 20030407.

GI



AB Title block copolymers comprise repeating unit blocks I and II, wherein X1, X2, X3, X4, X5 = H or protonic acid group (at least one of them is a protonic acid group); A1, A2, A3, A4 = direct bond, CH2, C(CH3)2, C(CF3)2, O, SO2, or CO; or g, h, i, j, k, l = 0 or 1; hydrogen of the arom. ring = H, CmH2m+1, Cl, F, CF3, or CN; and m = 1-10 integer. Thus, 42.23 g 3,3'-carbonylbis(sodium 6-fluorobenzenesulfonate) and 25.63 g bis(3-methyl-4-hydroxyphenyl)methane were reacted at 141° for 8 h to give a copolymer with reduced viscosity 0.13 dL/g and glass transition temp.  $\geq 250^\circ$ , 21.82 g 4,4'-difluorobenzophenone and 25.63 g bis(3-methyl-4-hydroxyphenyl)methane were added therein and reacted at 157° for 8 h to give a block copolymer with reduced viscosity 1.21 dL/g and glass transition temp.  $220^\circ$ , 4 g of the resulting block copolymer was dissolved in 36 g DMSO/dimethylacetamide mixt., cast onto a glass substrate, dried at  $200^\circ$ , washed, and proton-exchanged with sulfuric acid to give a proton conductive film with ion exchange capacity 510 g/mol, moisture absorption 12%, ion cond. 0.14 S/cm, and methanol permeability 0.4  $\mu\text{mol}/\text{cm}^2\cdot\text{minute}$ .

IT 785802-31-5P 812669-44-6P 812669-47-9P  
812677-79-5P

(intermediate; prepn. of proton conductive block-copolymers with good water resistance, low moisture absorption, and low methanol penetration for proton conductive membranes)

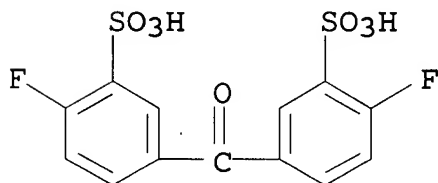
RN 785802-31-5 HCA

CN Benzenesulfonic acid, 3,3'-carbonylbis[6-fluoro-, disodium salt, polymer with 4,4'-methylenebis[2-methylphenol] (9CI) (CA INDEX NAME)

CM 1

CRN 210531-45-6

CMF C13 H8 F2 O7 S2 . 2 Na

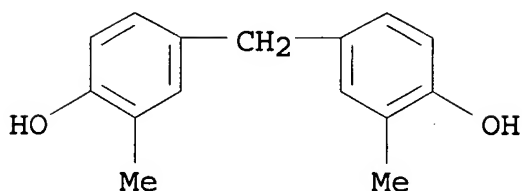


● 2 Na

CM 2

CRN 2467-25-6

CMF C15 H16 O2



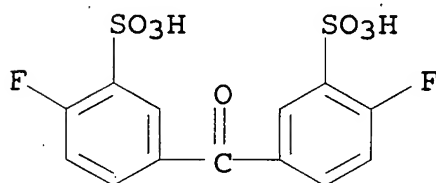
RN 812669-44-6 HCA

CN Benzenesulfonic acid, 3,3'-carbonylbis[6-fluoro-, disodium salt, polymer with 4,4'-methylenebis[2,6-dimethylphenol] (9CI) (CA INDEX NAME)

CM 1

CRN 210531-45-6

CMF C13 H8 F2 O7 S2 . 2 Na

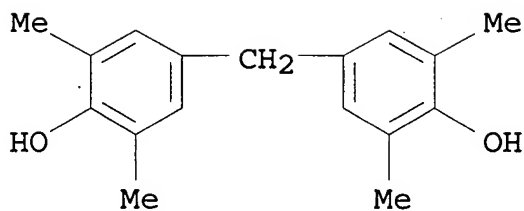


● 2 Na

CM 2

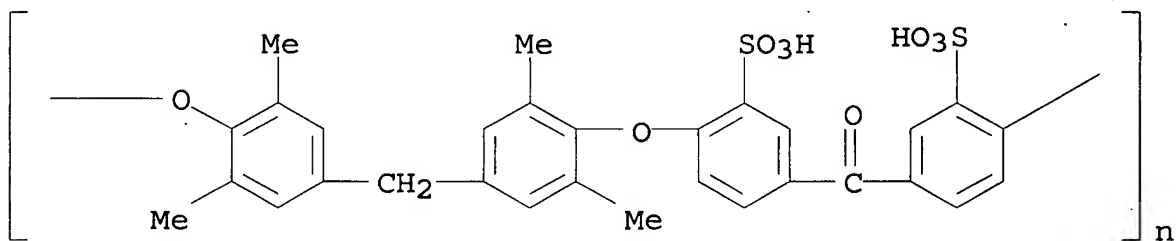
CRN 5384-21-4

CMF C17 H20 O2



RN 812669-47-9 HCA

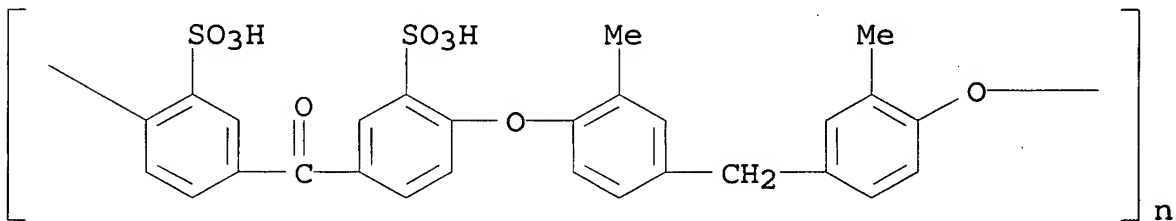
CN Poly[oxy(2,6-dimethyl-1,4-phenylene)methylene(3,5-dimethyl-1,4-phenylene)oxy(2-sulfo-1,4-phenylene)carbonyl(3-sulfo-1,4-phenylene)disodium salt] (9CI) (CA INDEX NAME)



● 2 Na

RN 812677-79-5 HCA

CN Poly[oxy(2-methyl-1,4-phenylene)methylene(3-methyl-1,4-phenylene)oxy(2-sulfo-1,4-phenylene)carbonyl(3-sulfo-1,4-phenylene)disodium salt] (9CI) (CA INDEX NAME)



● 2 Na

IT 785802-31-5P 812669-44-6P 812669-47-9P  
812677-79-5P

(intermediate; prepn. of proton conductive block-copolymers with good water resistance, low moisture absorption, and low methanol penetration for proton conductive membranes)

L57 ANSWER 4 OF 11 HCA COPYRIGHT 2007 ACS on STN

141:396499 Proton conductivity resin compositions with good water and solvent resistance for proton conductivity membranes and crosslinked articles. Ishikawa, Junichi; Omi, Katsuhiko; Kuroki, Takashi; Fujiyama, Akiko; Takeda, Koji; Tamai, Masashi (Mitsui Chemicals Inc., Japan). Jpn. Kokai Tokkyo Koho JP 2004307718 A 20041104, 24 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2003-105582 20030409.

AB Title compns. comprise protonic acid group-contg. crosslinkable arom. resins and basic group-contg. arom. resins. Thus, 0.525 mol 4,4'-difluorobenzophenone and 210 mL 50% fuming sulfuric acid were reacted at 100° for 12 h and neutralized with sodium hydroxide to give 155.2 g 5,5'-carbonylbis(sodium 2-fluorobenzenesulfonate), 33.78 g of which was reacted with 22.59 g 2,2-bis(3,5-dimethyl-4-hydroxyphenyl)propane at 135° for 16 h and 160° for 12 h to give a sodium sulfonate-contg. polyether-polyketone with reduced viscosity 0.84 dL/g, 3.733 g of the resulting polyether-polyketone was mixed with 0.425 g polyether pyridine obtained from 2,2'-bis(4-hydroxyphenyl)propane and 2,6-dichloropyridine in 16.0 g N-methylpyrrolidone, applied on a glass substrate, dried at 200° for 4 h, light-crosslinked, and proton-exchanged to give a proton conductive membrane with proton cond. 0.03 S/cm and good methanol resistance.

IT 515144-58-8DP, proton exchanged 515144-59-9DP, proton exchanged  
(crosslinked with basic polymer; proton cond. resin compns. with good water and solvent resistance for proton cond. membranes and crosslinked articles)

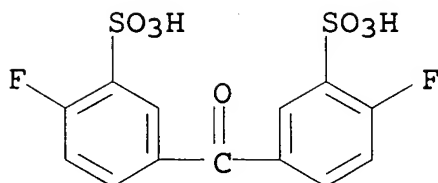
RN 515144-58-8 HCA

CN Benzenesulfonic acid, 3,3'-carbonylbis[6-fluoro-, disodium salt, polymer with 4,4'-(1-methylethylidene)bis[2,6-dimethylphenol] (9CI) (CA INDEX NAME)

CM 1

CRN 210531-45-6

CMF C13 H8 F2 O7 S2 . 2 Na

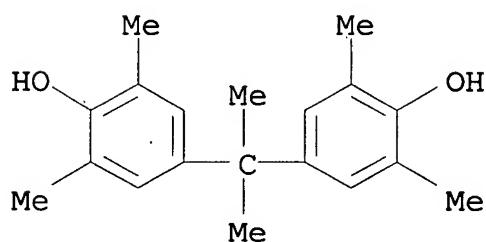


● 2 Na

CM 2

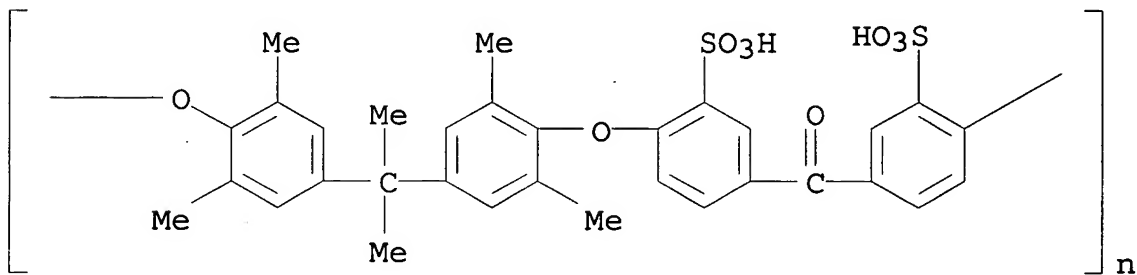
CRN 5613-46-7

CMF C19 H24 O2



RN 515144-59-9 HCA

CN Poly[oxy(2,6-dimethyl-1,4-phenylene)(1-methylethylidene)(3,5-dimethyl-1,4-phenylene)oxy(2-sulfo-1,4-phenylene)carbonyl(3-sulfo-1,4-phenylene) disodium salt] (9CI) (CA INDEX NAME)



● 2 Na

IT 515144-58-8P 515144-59-9P

(intermediate; proton cond. resin compns. with good water and solvent resistance for proton cond. membranes and crosslinked articles)

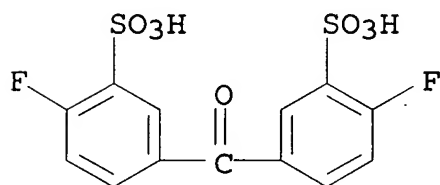
RN 515144-58-8 HCA

CN Benzenesulfonic acid, 3,3'-carbonylbis[6-fluoro-, disodium salt, polymer with 4,4'-(1-methylethylidene)bis[2,6-dimethylphenol] (9CI) (CA INDEX NAME)

CM 1

CRN 210531-45-6

CMF C13 H8 F2 O7 S2 . 2 Na

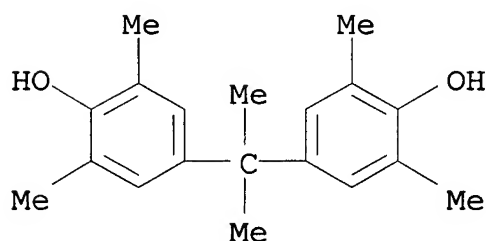


● 2 Na

CM 2

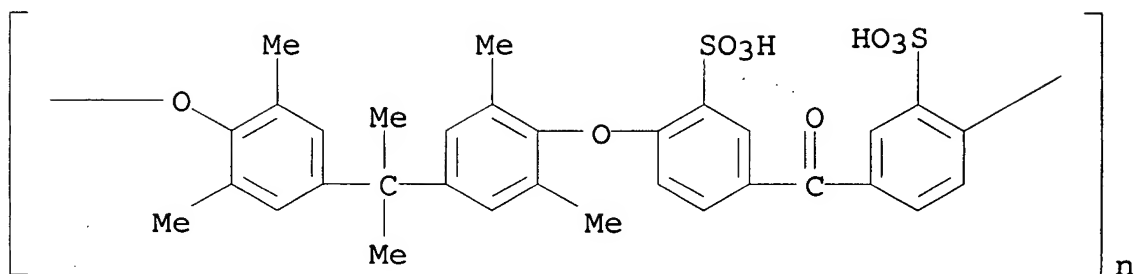
CRN 5613-46-7

CMF C19 H24 O2



RN 515144-59-9 HCA

CN Poly[oxy(2,6-dimethyl-1,4-phenylene)(1-methylethylidene)(3,5-dimethyl-1,4-phenylene)oxy(2-sulfo-1,4-phenylene)carbonyl(3-sulfo-1,4-phenylene) disodium salt] (9CI) (CA INDEX NAME)



● 2 Na

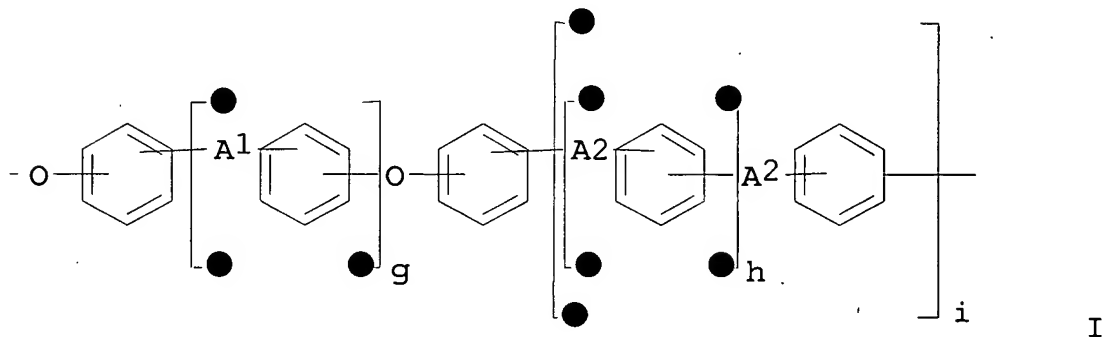
IT 515144-58-8DP, proton exchanged 515144-59-9DP,  
proton exchanged  
(crosslinked with basic polymer; proton cond. resin compns. with  
good water and solvent resistance for proton cond. membranes and  
crosslinked articles)

IT 515144-58-8P 515144-59-9P  
(intermediate; proton cond. resin compns. with good water and  
solvent resistance for proton cond. membranes and crosslinked  
articles)

L57 ANSWER 5 OF 11 HCA COPYRIGHT 2007 ACS on STN

141:396494 Proton-conductive polymer compositions with good adhesion for  
proton-conductive membranes in fuel cells. Kuroki, Takashi; Omi,  
Katsuhiko; Ishikawa, Junichi; Fujiyama, Akiko; Takeda, Koji; Tamai,  
Masashi (Mitsui Chemicals Inc., Japan). Jpn. Kokai Tokkyo Koho JP  
2004307629 A 20041104, 25 pp. (Japanese). CODEN: JKXXAF.  
APPLICATION: JP 2003-102676 20030407.

GI





AB The compn. comprises (A) 60-10% arom. polyether with flow starting temp. 100-220° having repeat unit I (A1, A2 = direct bond, -CH2-, -C(CH3)2-, -C(CF3)2-, -O-, -SO2-, -CO-; g, h, i = 0, 1) and (B) 40-90% proton acid-contg. arom. polyether. Thus, 2.0 parts polyaryletherketone powder prepd. from 4,4'-difluorobenzophenone, resorcin and anhyd. sodium carbonate was mixed with 2.0 parts proton acid-contg. polyaryletherketone powder obtained from 3,3'-carbonylbis(sodium 6-fluorobenzenesulfonate), bis(3-methyl-4-hydroxyphenyl)methane and anhyd. sodium carbonate in N-methyl-2-pyridone, applied to a glass plate and dried to give a film, which was proton-exchanged to form a proton conductive membrane showing ion cond. (hot melt) 0.14 S/cm.

IT 785802-31-5P 785802-38-2P  
(proton-conductive polymer compns. with good adhesion for proton-conductive membranes in fuel cells)

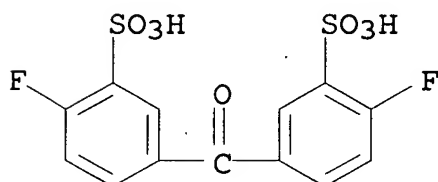
RN 785802-31-5 HCA

CN Benzenesulfonic acid, 3,3'-carbonylbis[6-fluoro-, disodium salt, polymer with 4,4'-methylenebis[2-methylphenol] (9CI) (CA INDEX NAME)

CM 1

CRN 210531-45-6

CMF C13 H8 F2 O7 S2 . 2 Na

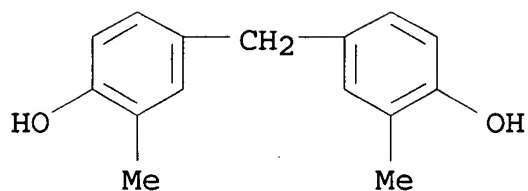


● 2 Na

CM 2

CRN 2467-25-6

CMF C15 H16 O2



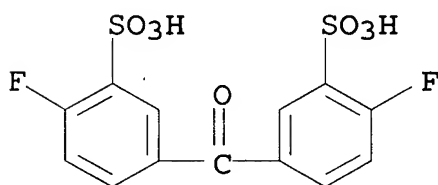
RN 785802-38-2 HCA

CN Benzenesulfonic acid, 3,3'-carbonylbis[6-fluoro-, disodium salt, polymer with 4,4'-methylenebis[2-methylphenol] and 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

CM 1

CRN 210531-45-6

CMF C13 H8 F2 O7 S2 . 2 Na

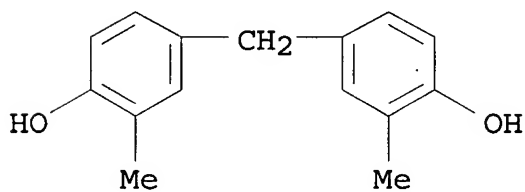


● 2 Na

CM 2

CRN 2467-25-6

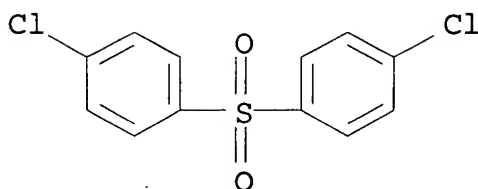
CMF C15 H16 O2



CM 3

CRN 80-07-9

CMF C12 H8 Cl2 O2 S



IT 785802-31-5P 785802-38-2P

(proton-conductive polymer compns. with good adhesion for proton-conductive membranes in fuel cells)

L57 ANSWER 6 OF 11 HCA COPYRIGHT 2007 ACS on STN

141:368416 Fuel cell and method for producing same. Obata, Takeshi; Nakamura, Shin; Yoshitake, Tsutomu; Kubo, Yoshimi; Omi, Takehiko; Tamai, Shoji; Kuroki, Takashi; Ikado, Shuhei (NEC Corporation, Japan; Mitsui Chemicals Inc.). PCT Int. Appl. WO 2004091027 A1 20041021, 44 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (Japanese). CODEN: PIXXD2. APPLICATION: WO 2004-JP4125 20040324. PRIORITY: JP 2003-105626 20030409.

AB An intermediate layer is formed between a catalyst layer and a solid polymer electrolyte membrane. The intermediate layer contains a protonic acid group-contg. arom. polyether ketone and catalyst particles.

IT 610322-52-6

(fuel cell and method for producing same)

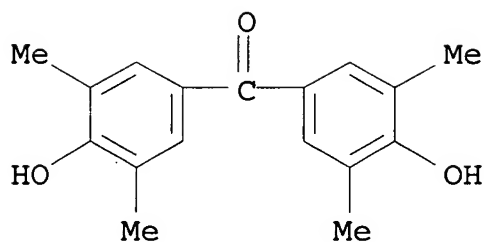
RN 610322-52-6 HCA

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with bis(4-hydroxy-3,5-dimethylphenyl)methanone (9CI) (CA INDEX NAME)

CM 1

CRN 92005-15-7

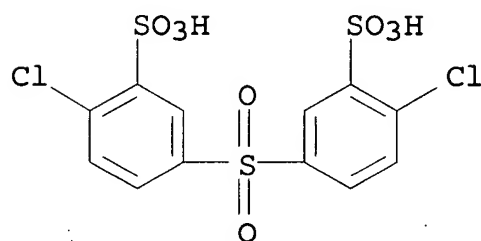
CMF C17 H18 O3



CM 2

CRN 51698-33-0

CMF C12 H8 Cl2 O8 S3 . 2 Na



● 2 Na

IT 610322-52-6

(fuel cell and method for producing same)

L57 ANSWER 7 OF 11 HCA COPYRIGHT 2007 ACS on STN

141:24033 A novel sulfonated poly(aryl ether sulfone)s derived from 3,3',5,5'-tetramethyldiphenyl-4,4'-diol. Lu, Hui; Li, Xianfeng; Na, Hui (Alan G Macdiarmid Institute and the College of Chemistry, Jilin University, Changchun, 130023, Peop. Rep. China). Polymer Preprints (American Chemical Society, Division of Polymer Chemistry), 45(1), 1040-1041 (English) 2004. CODEN: ACPAY. ISSN: 0032-3934.

Publisher: American Chemical Society, Division of Polymer Chemistry.

AB A novel sulfonated poly(aryl ether sulfone)s derived from 3,3',5,5'-tetramethyldephenyl-4,4'-diol. They shown good thermal stability, good soly. and most of the polymers can be cast into tough membranes, and the properties of membranes prepd. by the polymers were also studied. The membranes looking promising usage in fuel cell materials will be studied in future.

IT 698370-66-0P

(synthesis of sulfonated poly(aryl ether sulfone)s contg.

3,3',5,5'-tetramethyldiphenyl-4,4'-diol)

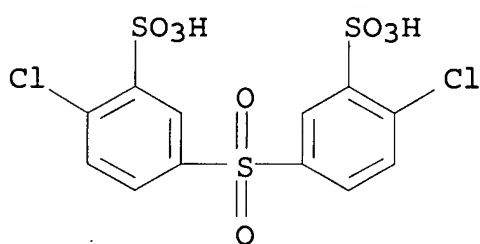
RN 698370-66-0 HCA

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt,  
polymer with bis(4-fluorophenyl)methanone and 3,3',5,5'-  
tetramethyl[1,1'-biphenyl]-4,4'-diol (9CI) (CA INDEX NAME)

CM 1

CRN 51698-33-0

CMF C12 H8 Cl2 O8 S3 . 2 Na

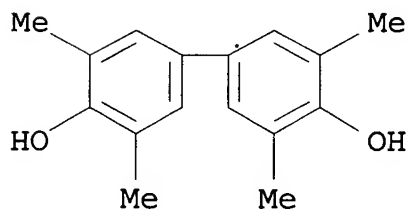


●2 Na

CM 2

CRN 2417-04-1

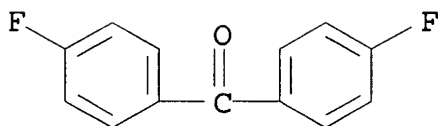
CMF C16 H18 O2



CM 3

CRN 345-92-6

CMF C13 H8 F2 O



IT 698370-66-0P

(synthesis of sulfonated poly(aryl ether sulfone)s contg.  
3,3',5,5'-tetramethyldiphenyl-4,4'-diol)

L57 ANSWER 8 OF 11 HCA COPYRIGHT 2007 ACS on STN

140:149110 Protonic acid-containing crosslinkable resins, their crosslinked products, and their use in fuel cells. Ishikawa, Junichi; Nakata, Tomoyuki; Fujiyama, Akiko; Omi, Katsuhiko; Tamai, Masashi (Mitsui Chemicals Inc., Japan). Jpn. Kokai Tokkyo Koho JP 2004026889 A 20040129, 78 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-181632 20020621.

AB The resins have crosslinkable groups (e.g., carbonyl, C1-10 alkyl bonded to arom. ring) and protonic acid groups (e.g., SO<sub>3</sub>H) and can be crosslinked by light, heat, or electron beam. Photocrosslinked products of the resins and fuel cell ion-conducting polymer membranes obtained from the resins or the photocrosslinked products are also claimed. The crosslinked resins have high ion cond. and MeOH resistance, so that the fuel cells such as DFFC using the membranes have high durability.

IT 515144-58-8DP, ion-exchanged

(blends with polyether-polyketones; protonic acid-contg.  
crosslinkable resins for ion-conducting membranes in fuel cells)

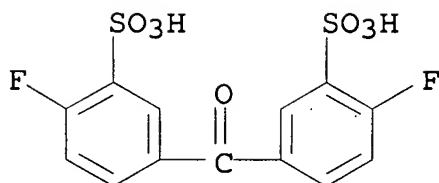
RN 515144-58-8 HCA

CN Benzenesulfonic acid, 3,3'-carbonylbis[6-fluoro-, disodium salt, polymer with 4,4'-(1-methylethylidene)bis[2,6-dimethylphenol] (9CI) (CA INDEX NAME)

CM 1

CRN 210531-45-6

CMF C13 H8 F2 O7 S2 . 2 Na

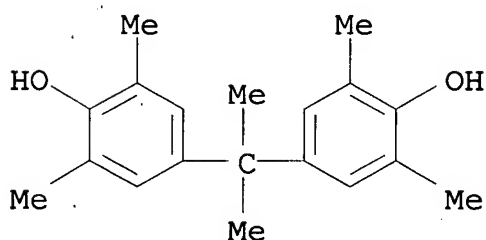


● 2 Na

CM 2

CRN 5613-46-7

CMF C19 H24 O2



IT 515144-58-8DP, ion-exchanged  
(blends with polyether-polyketones; protonic acid-contg.  
crosslinkable resins for ion-conducting membranes in fuel cells)

L57 ANSWER 9 OF 11 HCA COPYRIGHT 2007 ACS on STN

140:131099 Sulfonic acid group-containing cured resin products for fuel cell ion-conducting polymer membranes. Ishikawa, Junichi; Nakata, Tomoyuki; Fujiyama, Akiko; Omi, Katsuhiko; Tamai, Masashi (Mitsui Chemicals Inc., Japan). Jpn. Kokai Tokkyo Koho JP 2004026935 A 20040129, 21 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-182881 20020624.

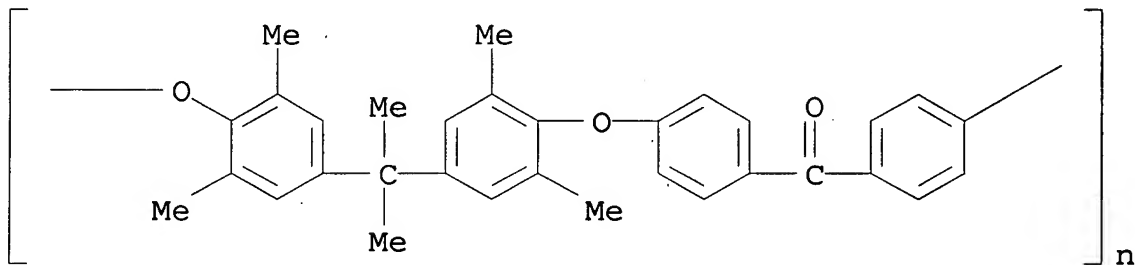
AB The cured products are obtained by sulfonating (1) cured materials of arom. polymers contg. carbonyl groups and C1-10 alkyl groups direct-bonded to arom. rings or (2) cured materials of compns. contg. carbonyl-contg. arom. polymers and arom. polymers contg. C1-10 alkyl groups direct-bonded to arom. rings with sulfonating agents. The membranes have high ion cond., MeOH resistance, and MeOH impermeability, giving the fuel cells with high durability.

IT 87781-17-7DP, sulfonated 87792-34-5DP,  
sulfonated

(sulfonic acid group-contg. cured resin products for fuel cell ion-conducting polymer membranes)

RN 87781-17-7 HCA

CN Poly[oxy(2,6-dimethyl-1,4-phenylene)(1-methylethylidene)(3,5-dimethyl-1,4-phenylene)oxy-1,4-phenylenecarbonyl-1,4-phenylene] (CA INDEX NAME)



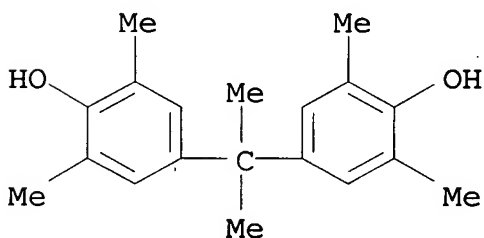
RN 87792-34-5 HCA

CN Methanone, bis(4-fluorophenyl)-, polymer with 4,4'-(1-methylethylidene)bis[2,6-dimethylphenol] (CA INDEX NAME)

CM 1

CRN 5613-46-7

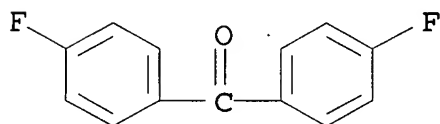
CMF C19 H24 O2



CM 2

CRN 345-92-6

CMF C13 H8 F2 O



IT 87781-17-7DP, sulfonated 87792-34-5DP,



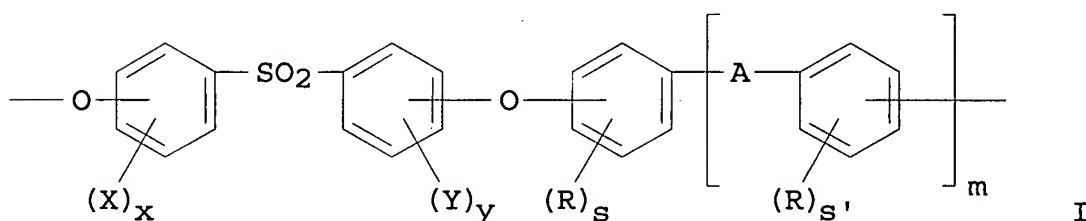
**sulfonated**

(sulfonic acid group-contg. cured resin products for fuel cell ion-conducting polymer membranes)

L57 ANSWER 10 OF 11 HCA COPYRIGHT 2007 ACS on STN

139:310058 Crosslinking polysulfones containing protonic acid groups, their manufacture, ion conductive polymer membranes, and fuel cells with such membranes. Ishikawa, Junichi; Nakata, Tomoyuki; Fujiyama, Akiko; Omi, Takehiko; Tamai, Masashi (Mitsui Chemicals Inc., Japan). Jpn. Kokai Tokkyo Koho JP 2003292609 A 20031015, 23 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-104461 20020405.

GI



AB Polysulfones having protonic acid groups in their chains and heat- and/or photocrosslinking groups in their chains and/or at terminals; their crosslinked products; their use as ion conducting polymer membranes in fuel cells; and such fuel cells are claimed. The said polymers preferably comprise structural repeating unit I (A = single bond, CH<sub>2</sub>, CMe<sub>2</sub>, O, S, SO<sub>2</sub>, CO; m = 0, 1, 2; R, R<sub>1</sub> = C1-10 alkyl; s, s' = integer of 0-4; X, Y = groups of sulfonic acid, carboxylic acid, phosphoric acid, their metal salt; x, y = integer of 0-2; x + y ≥ 1). Method for prepn. of such polymers by condensation polymn. of di-Ph sulfones and arom. diols, given in Markush structures, are also claimed. The membranes have excellent resistance to MeOH and water and give fuel cells with long service life.

IT 515144-34-0P 610322-52-6P

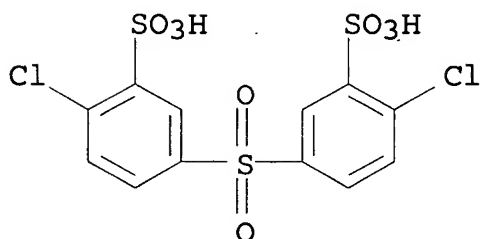
(crosslinked; manuf. of crosslinked polysulfone-polyether ionomers for membranes in fuel cells)

RN 515144-34-0 HCA

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with bis(4-fluorophenyl)methanone and 4,4'-(1-methylethylidene)bis[2,6-dimethylphenol] (9CI) (CA INDEX NAME)

CRN 51698-33-0

CMF C12 H8 Cl2 O8 S3 . 2 Na

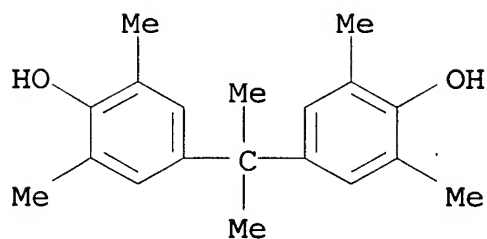


● 2 Na

CM 2

CRN 5613-46-7

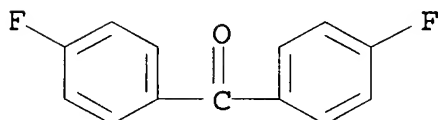
CMF C19 H24 O2



CM 3

CRN 345-92-6

CMF C13 H8 F2 O



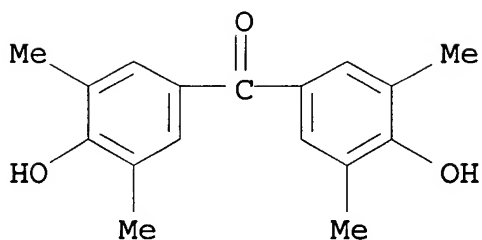
RN 610322-52-6 HCA

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with bis(4-hydroxy-3,5-dimethylphenyl)methanone (9CI) (CA INDEX NAME)

CM 1

CRN 92005-15-7

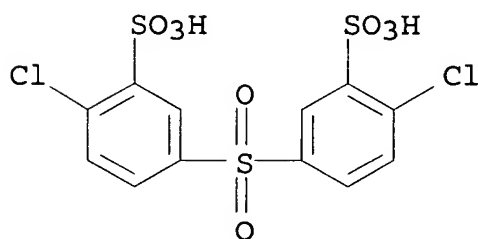
CMF C17 H18 O3



CM 2

CRN 51698-33-0

CMF C12 H8 Cl2 O8 S3 . 2 Na



● 2 Na

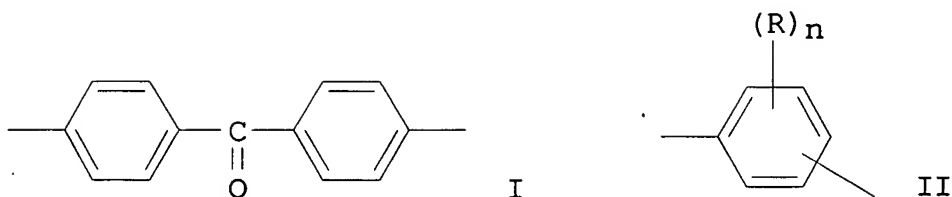
IT 515144-34-0P 610322-52-6P

(crosslinked; manuf. of crosslinked polysulfone-polyether ionomers for membranes in fuel cells)

L57 ANSWER 11 OF 11 HCA COPYRIGHT 2007 ACS on STN

139:124155 Photocrosslinkable polymer solid electrolyte for fuel cell proton exchange film, photocrosslinking polymer solid electrolyte film, and manufacture thereof,. Kitamura, Kota; Takase, Satoshi; Sakaguchi, Yoshimitsu; Nagahara, Shigenori; Hamamoto, Shiro; Nakao, Junko (Toyobo Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2003217342 A 20030731, 8 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-15986 20020124.

GI



AB The photocrosslinking polymer solid electrolyte contains  $\geq 1$  ionic group and  $\geq 1$  photocrosslinkable group on the mol. The ionic group may be sulfonic acid or phosphonic acid. The photocrosslinkable group may be represented by I and II ( $R = C1-10$  aliph. hydrocarbon; and  $n = \text{integer } 1-4$ ). The polymer backbone chain may be polyethersulfone or polyether ketone. The photocrosslinking polymer solid electrolyte exhibited not only excellent ionic cond. but also showed swelling resistance.

IT 565221-52-5P

(photocrosslinkable polymer solid electrolyte for fuel cell proton exchange film)

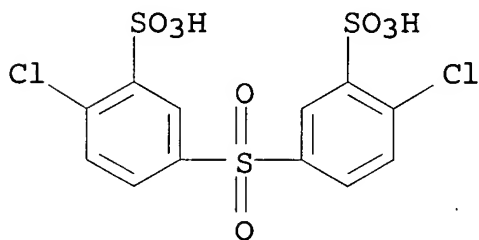
RN 565221-52-5 HCA

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with bis(4-fluorophenyl)methanone and 4,4'-(1-methylethylidene)bis[2-methylphenol] (9CI) (CA INDEX NAME)

CM 1

CRN 51698-33-0

CMF C12 H8 Cl2 O8 S3 . 2 Na

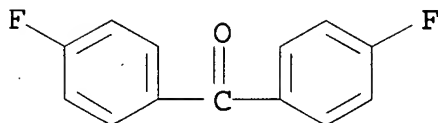


● 2 Na

CM 2

CRN 345-92-6

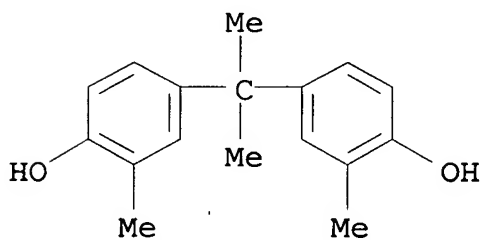
CMF C13 H8 F2 O



CM 3

CRN 79-97-0

CMF C17 H20 O2



IT 565221-52-5P

(photocrosslinkable polymer solid electrolyte for fuel cell  
proton exchange film)